"ज्ञान विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार"
-शिक्षणमहर्षी डॉ. बापूजी साळूंखे

Vivekanand College, Kolhapur (Autonomous)
Department of Statistics
Internal Examination (2022-23)
Notice

Date: 09/ 11/ /2022

All the students of B.Sc. – I, II & III are hereby informed that, the internal examination of semester- I, III &V will be held as per following time table.

B.Sc I

Sr. No.	Class	Date	Time	Paper Code	Title of the Paper
01	B.Sc I	24/11/2022	10:30 am to 11:00 am	DSC-1004A	Descriptive Statistics - I
		25/11/2022	11:00 am to 11:30 am	DSC-1004A	Elementary Probability Theory

Nature of Question paper: Total 15 Marks

Q.1 Choose correct alternatives (05 Marks)

Q.2 Attempt any one (4 Marks)

Q.3 Attempt any three (6 Marks)

B.Sc II

Sr. No.	Class	Date	Time	Paper Code	Title of the Paper
01	B.Sc II	24/11/2022	4:30 pm to 5:00 pm	DSC-1004C1	Probability Distributions I
		25/11/2022	2:45 pm to 3.30 pm	DSC-1004C2	Statistical Methods

Nature of Question paper: Total 20 Marks

Multiple choice questions: 10 on both sections.

B.Sc III

Sr. No.	Class	Date	Time	Paper Code	Title of the Paper
01	B.Sc III	15/11/2022	11.30 am to 12.30 pm	DSE 1004E1	Section I: Probability Distributions
		17/11/2022	11.30 am to 12.30 pm		Section II: Probability Theory
		18/11/2022	11.30 am to 12.30 pm	DSE 1004E2	Section I: Sampling Theory
		19/11/2022	11.30 am to 12.30 pm		Section II: Operations Research

Nature of Question paper: Total 20 Marks

Multiple choice questions: 10 on both sections.

(Ms. V. V. Pawar)

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DEPARTMENT OF STATISTICS
VIVEKANAND COLLEGE, KOLHAPUR

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)
B.Sc. Part- I (Statistics) (Sem-I)
Internal Examination-2023
Section -I: Descriptive Statistics -I

Day: Tuesday **Time: 4pm to 5pm**
Date: 24/11/2022 **Marks : 15**

Instructions: (for example)
1) All the questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of log table/calculator is allowed.

Q. 1. A) Select correct alternative **[05]**

i) Which one of the following is least affected by extreme values?
A) A.M. B) G.M. C) H.M. D)Median

ii) With the help of ogive curve, one cannot determine....
A) Median B) Deciles C) Percentiles D) Mode

iii) Which one of the following is called as the best measures of dispersion?
A) Range B) mean deviation
C) Coefficient of variation D) Standard deviation

iv) If the mode of a frequency distribution M_o=25 and its mean $\bar{X} = 25$,then median of the distribution is .....
A) 15 B) 0 C) 25 D) 32

v) Mean deviation about ..... is always less than mean deviation about any point.
A) Mean B) Median C) Mode E)GM

Q. 2. Attempt any one **[4]**

i) Write the merits of Median.
ii) If a & b are two positive observations then show that $A.M. \geq G.M. \geq H.M.$

Q. 3. Attempt any one **[6]**

i) Define Percentile
ii) Define Standard deviation
iii) Define Mean deviation
iv) Define Geometric Mean
v) Define Mode

VIVEKANAND COLLEGE ESTD JUNE 1964 KOLHAPUR - 416003

Vivekanand College, Kolhapur (Autonomous)
Department of Statistics
B.Sc. II SEM III Internal Examination
Subject: Probability Distribution and Statistical Methods II
Date: 17/11/2022 **Time: 4:15 pm to 5:00 pm**

Section I: Probability Distribution II

i) Suppose X_1, X_2, X_3 are independent gamma variates with parameters (8, 3), (8, 5), (8, 8) respectively and $Z = X_1 + X_2 + X_3$, then distribution of Z is
i) G(8, 16) ii) G(8, 10) iii) G(8, 9) iv) G(8,5)

ii) If $X \sim G(\theta, n)$ then distribution of 6X follows----------.
i) $G(6\theta, n)$ ii) $G(\theta, 6n)$ iii) $G(\theta, \frac{n}{6})$ iv) $G(\frac{\theta}{6}, n)$

iii) If $X \sim \beta_2(m, n)$, then p.d.f of 1/X is.....
i) $\beta_1(m, n)$ ii) $\beta_1(n, m)$ iii) $\beta_2(m, n)$ iv) $\beta_2(n, m)$

iv)If $X \sim \beta_2(m, n)$,then mean of X is ...
i) $\frac{m}{n-1}$ ii) $\frac{n}{m-1}$ iii) $\frac{n-1}{m}$ iv) $\frac{m-1}{n}$

v)If X and y are iid gamma variates then distribution of $\frac{X}{X+Y}$ is....
i) Gamma distribution ii) Beta distribution of Ist kind
iii) Beta distribution of II nd kind iv) Exponential distribution

vi) If X has chi-square distribution with variance 20 then mean of the distribution is.....
a) 0 b) 10 c) 20 d) None of these

vii) If X has Chi-square distribution with mode 12 then its m.g.f. is...
i) $(1-2t)^{-6}$ ii) $(1-2t)^{-12}$ iii) $(1-2t)^{-10}$ iv) $(1-2t)^{-7}$

viii) If $X \sim t_n$ then mean of X is
i) n ii) 2n iii) 0 iv) None of these

ix) If X follows t-distribution with 8 d.f. then Var(X) is .....
i) $\frac{3}{5}$ ii) $\frac{5}{3}$ iii) $\frac{4}{3}$ iv) $\frac{3}{4}$

x)If $X \sim F(n_1, n_2)$, If $n_2 \to \infty$then n1F has the distribution
i) t_{n1} ii) $F_{n1, n2}$ iii) χ^2_{n1} iv) $F_{n2, n1}$

Vivekanand College, Kolhapur (Autonomous)
Department of Statistics
B.Sc. II SEM III Internal Examination
Subject: Probability Distribution and Statistical Methods II
Date: 18/11/2022 **Time: 2:45 pm to 3:30 pm**

Section II: Statistical Methods II

1)A type of statistical test based on type of ... hypothesis.
A) Simple B) Null C) Alternative D) Composite

2)In testing of hypothesis, type II error is ...
A) Reject H_0 when it is true B) Accept H_0 when it is true
C)Reject H_0 when it is false D) Accept H_0 when it is false

3)Probability of rejecting H_0 when it is true is equal to .....
A) level of significance B) probability of type I error
C) both a and b D) power of the test

4)If Z_{cal} and Z_α be the respectively calculated and critical values of test statistic based on large sample size then for right tailed null hypothesis H_0 is rejected if and only if ...
A) $Z_{cal} > Z_\alpha$ B) $Z_{cal} < Z_\alpha$ C) $|Zcal| > Z_\alpha$ D) $Z_{cal} < -Z_\alpha$

5)With usual notations based on large sample size test statistic to test $H_0: \mu = 0$ v/s $H_1: \mu \neq 0$ is...
A) $\frac{\bar{x}}{\sigma/\sqrt{n}}$ B) $\frac{\bar{x}-\mu}{s/\sqrt{n}}$ B) $\frac{\bar{x}}{\theta/\sqrt{n}}$ D) $\frac{\bar{x}}{\sigma/n}$

6) Student t-test is applicable in case of testing equality of....
A) means B) proportions
C) variances D) correlations

7)The degree of freedom of test statistic in paired t – test based on n pairs of observations is ...
A) n – 1 B) n C) 2(n – 1) D) 2n

8)The Chi-square test is not used for ....
A) testing goodness of fit
B) testing independence of attribute
C) testing equality of two population variance
D) testing goodness of fit of regression line

9)The value of test statistic in F – test used for testing equality of two population variances is always ...
A) > 0 B) < 0 C) > 1 D) Between 0 and 1

10) Equality of two normal population variances can be tested by .....
A) F test B) Z test C) Chi-square test D) t test

Vivekanand College, Kolhapur (Autonomous)
Department of Statistics
B.Sc. III Sem V Internal Examination 2022-23
Subject: Probability Theory
Total Marks 10 **Date: 17 /11/2022**

1) If x_1, x_2, x_3 is r.s. form U (0,1) distribution then expected value of $x_{(2)}$ is .....
A) 0.4 B) 0.6 C) 0.5 D) 0.1

2) If $x_1, x_2 \ldots\ldots x_n$ is r.s. of size n from U (0,1) then probability distribution of n^{th} (maximum) order statistic is.....
A) $n(1-x)^{n-1}$ B) nx^{n-1} C) $(n-2)^{n-2}$ D) $(n-1)(1-x)^{n-1}$

3) Let $x_1, x_2 \ldots\ldots$ xn is i.i.d. random variables with pdf f(x) and distribution function F(x) then distribution function of 1^{st} (minimum) order statistic is.....
A) $1-[1-F(x)]^n$ B) $[F(x)]^n$ C) $[1-F(x)]^n$ D) $[1-F(x)]^{n-1}$

4) Convergence in distribution of sample mean to normal distribution this result is given by,
A) Chebychev's inequality B) Weak law of large Number
C) Central limit theorem D) chapman kolmogorav equation

5) If x1, x2..... xn are independent random sample drawn from population with mean μ_i And finite variance σ^2 then WLLN states,

A) $\bar{X}_n \xrightarrow{p} \mu$ B) $\bar{x}_n \xrightarrow{p} \bar{\mu}$ Where, $\bar{\mu} = \frac{1}{n}\sum \mu_i$

C) $x_n \xrightarrow{p} \bar{\mu}$ D) $x_n \xrightarrow{p} \mu$

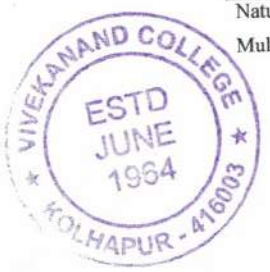
6)Let $X_1, X_2, \ldots$ be a sequence of independent and identically distributed Chi-square random variables, each having 4 degrees of freedom. Define $S_n = \sum X_i^2$ $n = 1,2,,\ldots$. If $\frac{S_n}{n} \xrightarrow{p} \mu$, as $n \to \infty$ then μ is equal to.....
A) 8 B) 16 C) 24 D) 32.

7) If $X_n \xrightarrow{P} X$, then.....
A) $X_n^2 \xrightarrow{P} X$ B) $KX_n^2 \xrightarrow{P} KX$
C) $(X_n^2 - X) \xrightarrow{P} 0$ D) $X_n^2 \xrightarrow{P} X^2$

8) If $P=P_{ij}$ is transition probability matrix of Markov chain then state j is accessible from sate i iff .....
A) $P_{ij} > 0$ B) $P_{ji} > 0$
C) $P_{ij}^{(n)} > 0$ *for some n* D) $P_{ji}^{(n)} > 0$ *for some n*

9) If in a transition probability matrix of Markov chain $P=(P_{ij})$, the element $P_{zz} = 1$ then Z is .....
A) absorbing and not recurrent
B) recurrent and not absorbing
C) recurrent and absorbing
D) none of them

10) Higher order transition probabilities are expressed in lower order transition probabilities using .....
A) Markov inequality B) Chebychev's inequality
C) Chapman-Kolmogorov equation D) None of these



"ज्ञान विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार"
-शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Vivekanand College, Kolhapur (Autonomous)
Department of Statistics
Internal examination (2022-23)
Notice

Date: 05 /04 /2023

All the students of B.Sc. – I, II & III are hereby informed that, the internal examination of semester- II, IV&VI will be held as per following time table.

B.Sc I

Sr. No.	Class	Date	Time	Paper Code	Title of the Paper
01	B.Sc I	12/04/2023	02.00 pm to 03.00 pm	DSC-1004B	Descriptive Statistics II
		13/04/2023	11.15 am to 12.15 pm	DSC-1004B	Discrete Probability Distributions

Nature of Question paper: Total 15 Marks
Q.1 Choose correct alternatives (05 Marks)
Q.2 Attempt any one (4 Marks)
Q.3 Attempt any three (6 Marks)

B.Sc II

Sr. No.	Class	Date	Time	Paper Code	Title of the Paper
2	B.Sc II	12/04/2023	2.45 pm to 03.30 pm	DSC-1004D1	Probability Distributions -II
		13/04/2023	4.15 pm to 5.00 pm	DSC-1004D2	Introduction to Reliability Theory & Testing of Hypothesis

Nature of Question paper: Total 15 Marks
15 MCQ's for 1 mark each

B.Sc III

Sr. No.	Class	Date	Time	Paper Code	Title of the Paper
01	B.Sc III	10/04/2023	11.30 am to 12.30 pm	DSC-1004F1	Statistical Inference-II
		12/04/2023	11.30 am to 12.30 pm	DSC-1004F2	Design of Experiments, Quality Management & Data Mining

Nature of Question paper: Total 20 Marks
Multiple choice questions: 10 on both sections.

(Ms. V. V. Pawar)
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Vivekanand college, Kolhapur (Autonomous)
Department of Statistics
BSc-I -Sem -II Internal Examination
Subject-Discrete probability distributions

Date-13/04/2023 **Total marks 20**

Q.1 Choose the correct alternative. (04)

1) A random variable X→H(N, M,n) when N→ ∞ and $\frac{M}{N}$ = p, the distribution of X is…..

a) B(n,q) b) B(M,p) c) B(n,p) d) None of these

2) Sum of independent identically distributed Bernoulli r.v.s is……..

A) Binomial Distribution B) Poisson Distribution
C) Discrete uniform Distribution D) Geometric Distribution

3) Relation between mean and variance of Binomial distribution is

a) mean < variance b) mean > variance
c) mean = variance d) none of these

4)If X→ B(n,p) tends to Poisson(m) distribution if,……

A) $n \to \infty, p \to 1/2$ B) $n \to 0, p \to \infty$

C) $n \to 100, p \to 0$ D) $n \to \infty, p \to 0, np = m > 0$

5) If discrete random variable X follows Uniform distribution on 1, 2, 3….n then variance of X is----

A) $(n^2-1)/12$ B) $(n^2-1)/12$ C) (n+1)/2 D) (n-1)/2

Q.2 Attempt any one **(04)**

1) Find mean and variance of Poisson distribution.
2) Define uniform distribution .Obtain its mean and variance.

Q.3 Attempt any three. **(06)**

1) Define Bernoulli distribution .Find its mean.
2) Write additive property of Binomial distribution.
3) Define Hyper geometric distribution Write its mean and variance.
4) Obtain recurrence relation for Binomial distribution.
5) Write note on nature of Binomial distribution.

Vivekanand college, Kolhapur (Autonomous)
Department of Statistics
B.Sc. II Sem IV Internal Examination
Paper VIII: Introduction to Reliability Theory & Testing of Hypothesis
Total Marks 15 **Date: 13/04/2023**

Instructions:
1) All the questions are compulsory.
2) Each question carries one mark

1) Given statement are

i) Critical region is the region of accepting H_0
ii) H_0:|θ| =0 is a simple null hypothesis.
iii) Student t-test is applicable only for large samples.
iv) H_1: $\mu_1 < \mu_2$ is left tailed hypothesis.

Among the given statement false statements are …….

A) ii) and iv) B) i) and iii) C) ii) and iii) D) None of the above

2) A sample of 12 items are taken from N(μ, σ^2) both μ and σ^2 unknown. To test H_0: μ = 15 against H_1: $\mu \neq 15$ you will use ……

A) t test B) Chi-square test C) Normal test D) F test

3) Standard error of statistic T is given by……

A) $E\sqrt{[T-E(T)]^2}$ B) $\sqrt{E[T-E(T)]^2}$
C) $E(T^2)$-$[E(T)]^2$ D) $E\sqrt{T^2-T}$

4) For testing hypothesis H_0: $\sigma^2 = \sigma_0^2$ which of the following test to be used?

A) Z test B) Chi-square test C) t test D) F test

5) The mean difference between nine paired observations is 15 and the standard deviation of difference is 5. The value of statistic t is ….

A) 0 B) 3 C) 27 D) 9

6)The value of chi square statistic for good ness of fit test is zero if ……

A) $\sum O_i = \sum E_i$ B) $\sum O_i < \sum E_i$
C) $O_i = E_i$ for all i D) All of the above

7) Test of hypothesis H_0: $\mu = 1500$ against H_1: $\mu < 1500$ leads to ….test.

A) One sided right tailed B) Two tailed
C) One sided left tailed D) All of the above

8) In the context of testing statistical hypothesis, if level of significance α increased then ….

A) Rejection region is unaltered
B) Rejection region decreases
C) Rejection region also increases
D) Rejection region depends on the form of alternative.

9) Probability of rejecting H_0 when it is true is equal to ……..

A) level of significance B) probability of type I error
C) both A and B D) power of the test

10) A parametric hypothesis which completely specifies all the parameters in a probability distribution is called as …

A) Simple hypothesis B) Simple or composite hypothesis

C) Composite hypothesis D) None of these

11)The Chi-square test is not used for ….
A) testing goodness of fit
B) testing independence of attribute
C) testing population variance
D) testing goodness of fit of regression line

12)The degree of freedom of Chi-square test statistics for testing independent attributes in case of 4×3 contingency table are……..

A) 12 B) 9 C) 8 D) 6

13)The value of test statistic in F – test used for testing equality of two population variances is always …
A) > 0 B) < 0 C) > 1 D) Between 0 and 1

14) Equality of two normal population variances can be tested by …..
A) F test B) Z test C) Chi-square test D) t test

15) With usual notations based on small sample size test statistic to test H_0: $\mu = 0$ v/s H_1: $\mu \neq 0$ is…

A) $\frac{\bar{X}}{\sigma/\sqrt{n}}$ B) $\frac{\bar{X}-\mu}{\sigma^2/\sqrt{n}}$ C) $\frac{\bar{X}}{s/\sqrt{n}}$ D) $\frac{\bar{X}}{\sigma/n}$

Vivekanand College, Kolhapur (Autonomous)
Department of Statistics
BSc-III -Sem -VI Internal Examination
Date: 10/04/2023 Subject-Statistical Inference II Time: 11.30 am to 12.30 pm

1) The most preferred confidence interval for a parameter Θ should be….
a) with shortest width and largest confidence coefficient
b) with largest width and largest confidence coefficient
c) based on sufficient statistics
d) both (a) and (b)

2) Given that P(4.4≤ μ ≤ 15.7)= 0.90, Which of the following is correct?
a) The width of confidence interval is 11.3.
b) 4.4 and 15.7 are 90% confidence limits of μ.
c) Probability that μ lies in the interval (4.4, 15.7) is .90
d) All (a) to (c) are true

3) If $X_1, X_2, \ldots, X_n$ is a random sample from exponential with parameter θ then interval estimate of θ can be obtained by use of….
a) Normal distribution b) t-distribution
c) Chi-square distribution d) F-distribution

4) A sample of size 144 from N (μ, σ^2) gives the sample mean $\bar{X}$ =10 and sample variance s^2=36 then 95% confidence interval for μ is….
a) (9.02, 10.98) b) (9.02, 9.98) c) (10.02, 10.98) d) (9.20, 10.98)

5) If random variable X has N(μ,σ^2)-distribution then which of the following is simple null hypothesis?
a) |μ|=0 b) μ=10 c) σ^2=16 d) μ=10, σ^2=16

6) Which of the following statement is false?
a) Probability of rejecting H_0 when H_1 is true is known as type II error.
b) Neyman Pearson test leads to a Most powerful test.
c) Probability of rejecting H_0 when H_0 is true is known as type I error.
d) All the above are true

7) LR-test for testing the equality of variances H_0: $\sigma_1^2 = \sigma_2^2$ against H_1: $\sigma_1^2 \neq \sigma_2^2$ of two normal populations with unknown means is equivalent to a….
a) Student t-test b) F-test c) Chi-square test d) Z-test

8) An urn contains 10 marbles of which θ are white and remaining are black. To test H_0: θ=4 against H_1:θ=5 the following procedure is used. Take a sample of 2 marbles from urn by without replacement scheme and reject H_0 if they are of different colors. The power of this test is:
a) 4/9 b) 1/3 c) 5/9 d) 2/3

9) If statistical test T for testing simple null hypothesis against simple alternative is at least as powerful as any other test then it is known as….
a) UMP – test b) MP – test
c) LR – test d) None of them

10) If we increase the confidence level, the confidence interval length is_____.
a) Decreases b) Increases
c) Stays as same on data. d) may increase or decrease depending